

SEMI-YEARLY REPORT
(for July - December 2000)

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Enhanced Land cover and Land Cover Change products from MODIS
Post Launch Studies

by

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1. At-launch Land Cover Product.

a. Task Objectives:

The principal objective of this task is to supply a validated at-launch land cover product based on the AVHRR at a resolution of 1 km.

b. Task Progress:

We successfully generated a 1 km land cover product to be included with EDC's DISCover product as the MODIS at-launch product.

This product conforms to MOD12 file specifications as much as possible and contains both the UMD and EDC land cover products. It is tiled and gridded in the integerized sinusoidal projection and possibly the Goode's Homolosine projection as well.

A final version of the UMD 1km land cover map was completed in March 1998. The meta-data describing the quality of both the EDC 1 km product and our own have been prepared. Validation of our land cover product is being carried out.

A final version of the coding for the output of the 1km land cover product has been delivered to SDST for use as simulated data.

A paper describing the UMD 1km land cover classification is in press of a special issue of the International Journal of Remote Sensing (Hansen, DeFries, Townshend, Sohlberg, Global Land Cover Classification at 1km Spatial Resolution Using A Supervised Decision Tree Approach - International Journal of Remote Sensing 21(6&7): 1331-1364).

In response to NASA headquarters' request, we have generated a global tree cover poster describing the percent coverage of forest, needleleaf vs broadleaf forest and evergreen vs coniferous forest within each 1km pixel of the world. The poster has been delivered to several federal government agents and the White House.

A grand new version of the Algorithm Theoretical Basis Document (ATBD) of the 1km land cover classification product has been created and published on NASA's ATBD web site.

Generation of the version 3.0 of the 1km land cover classification product is in progress. This version distinguishes small grain crops and broadleaf crops and will have several questions addressed. This distinction is needed by several members of the MODIS science team for creating their own products.

The version 3.0 of the 1km land cover classification product is produced and delivered to SDST and relevant MODLAND science team members.

c. Anticipated Activities During the Next Semi-year:

Land cover studies will mainly focus on the development of the vegetation continuous fields which is a MODIS post-launch product. Major activities are presented in part 3 of this report.

2. Land cover change indicator product.

a) Task objectives

i) Generation of test data sets.

ii) Production and testing of the at-launch change detection algorithm.

iii) Production and testing of post-launch change detection algorithm.

b) Task progress

i) Totally 12 sets of test data have been generated and archived for use.

ii) More than three papers about the MODIS at-launch algorithms of land cover change detection have been published. A grand new version of the Algorithm Theoretical Basis Document (ATBD) of the land cover change indicator product has been created and published on NASA's ATBD web site (details are in the report for the January-June 1999 semi-year).

As a new contribution of the UMD MODIS team, processing of 250m resolution MODIS data (band 1 and 2) higher than Level 2 will be carried out in UMD campus. The required computer codes and networking, storage hardware have been made ready.

Major activities are focusing on the compositing of 250m resolution MODIS Level 2G data. A new compositing procedure is being tested and expected to produce better composited results.

The land cover change detection code is tested with collected MODIS data and are found that the LUTs generated with AVHRR data may cause large commission errors although some of the algorithms selected in the code did give reasonable results.

A paper titled "Vegetative Cover Conversion Product from MODIS 250m Data: Early results" is presented by John Townshend to an AGU's 2000 Fall Meeting special session on early results from EOS-Terra satellite (see an abstract in EOS, Transactions of AGU Vol. 81, No.48, Page 274).

Other new publications related to the land cover change product are:

Justice, C., Townshend, J.R.G., et al., Preliminary land surface products from the NASA Moderate Resolution Imaging Spectroradiometer (MODIS). IGARSS 2000, 24-28 July Honolulu, Hawaii.

Zhan, X., Townshend, J.R.G. and DeFries, R., A Review and Intercomparison Study on Land Cover Change Detection Techniques Using Satellite Remote Sensing Data. IGARSS 2000, 24-28 July Honolulu, Hawaii

iii) Refinement of the change detection algorithms are considered for the post-launch land cover change indicator product during the testing of the at-launch product software.

c) Anticipated Activities during the Next Semi-year

- i) No more actions on test data generation are planned.
- ii) Findings from the testing of the computer code of the MODIS at-launch land cover change indicator product with the test data will be detailed in a paper for publication. A first MODIS Vegetative Cover Conversion product will be released on March 30.
- iii) With the results from the testing of the algorithms for the at-launch product, we will refine the change detection algorithms for the post-launch land cover change indicator product. The computer software will be updated.

3. Continuous fields of land cover properties

a) Task objectives

Generation of continuous fields of land cover attributes

b) Task progress

A global tree cover poster describing the percent coverage of forest, needleleaf vs broadleaf forest and evergreen vs coniferous forest within each 1km pixel of the world was generated and has been delivered to several federal government agents and the White House. Several papers describing the global vegetation continuous fields have been already published (see last report for details). A grand new version of the Algorithm Theoretical Basis Document (ATBD) of the vegetation continuous fields product has been created and published on NASA's ATBD web site.

The computer code for the MODIS Vegetation Continuous Fields post-launch product is already written and in the debugging stage.

Field measurements and survey for validating the prototype product of Vegetation Continuous Fields have been carried out in a local park and South Africa where various land cover types exists and airphotos are available.

A paper titled "Continuous Fields of Vegetation Characteristics from MODIS data" has been presented by Matt Hansen to an AGU's 2000 Fall Meeting special session on early results from EOS-Terra satellite (see an abstract in EOS, Transactions of AGU Vol. 81, No.48, Page 274).

c) Anticipated Activities during the Next Semi-year

We plan to a first MODIS Continuous Fields from MODIS 500mdata on July 31, 20001.

The computer code for the MODIS Vegetation Continuous fields post-launch product will be delivered after a successful debugging stage.